Service instructions

CRT 2 and 4

Model A

Produced after 0335 (yyww)

50/60 Hz, IEC

1/3~

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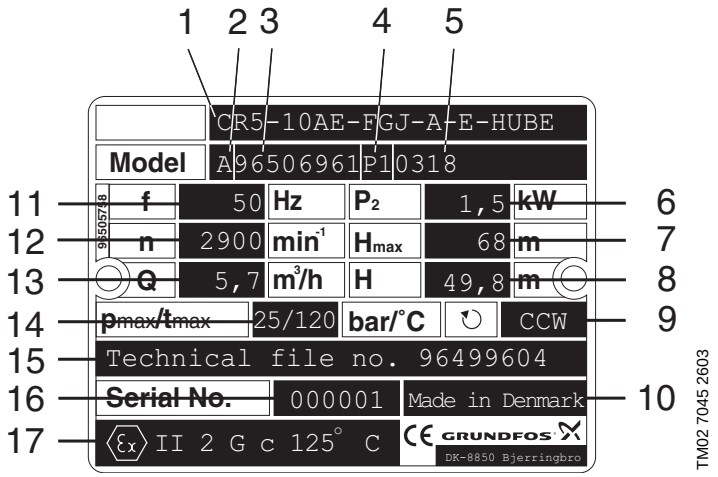
1. Type identification

1.1 Nameplate



Pos.	Description
1	Type designation
2	Model
3	Product number
4	Place of production
5	Production year and week
6	P_2
7	Closed valve head, 50 Hz
8	Head at rated flow rate, 50 Hz
9	Direction of rotation CCW: Counter-clockwise CW: Clockwise

Pos.	Description
10	Country of production
11	Frequency
12	Speed
13	Rated flow rate
14	Maximum pressure and temperature
15	The number of the copy of the technical file kept at KEMA (stated if the pump is ATEX classified)
16	The serial number of the pump (stated if the pump is ATEX classified)
17	ATEX category (stated if the pump is ATEX classified)

1.2 Type key

Example	CRT	8-	10	AE-	FGJ-	A-	E-	AUUE

Type range

Rated flow rate m³/h

Number of stages

Code for pump version
- A = Basic version
- B = Oversize motor
- E = Certificate/approval
- F = Pump for high temperatures (air-cooled top)
- H = Horizontal version
- HS = High-pressure pump with over-synchronous speed and reversed chamber stack and direction of rotation
- I = Different pressure rating
- K = Pump with low NPSH
- M = Magnetic drive
- P = Undersize motor
- R = Horizontal version with bearing bracket
- SF = High-pressure pump with reversed chamber stack and direction of rotation
- T = Oversize motor (two flange sizes bigger)
- X = Special version, or the pump consists of more than two versions

Code for pipe connections
- A = Oval flange
- B = NPT-thread
- CA = FlexiClamp (CRI,CRN)
- CX = TriClamp (CRI,CRN)
- F = DIN flange
- FGJ = DIN, ANSI and JIS flange
- GJ = ANSI and JIS flange
- G = ANSI flange
- J = JIS flange
- N = Different connection diameter
- O = Externally threaded, union
- P = PJE coupling
- W = Internally threaded
- X = Special version

Code for materials
- A = Pump head: Cast iron
  Other parts in contact with the pumped liquid: stainless steel DIN W.-Nr. 1.4301
- D = Carbon-graphite filled PTFE (bearings)
- G = Stainless steel parts of DIN W.-Nr. 1.4401 / AISI 316 or better class
- GI = Base plate and flanges of DIN W.-Nr. 1.4408 / AISI 316LN or better class
- I = Stainless steel parts of DIN W.-Nr. 1.4301 / AISI 304 or similar class
- II = All part of stainless steel; parts in contact with the pumped liquid of DIN W.-Nr. 1.4301/AISI 304
- K = Bronze (bearings)
- S = Silicon carbide bearings and PTFE neck rings (standard in CR)
- T = Titanium
- X = Special version

Code for rubber parts
- E = EPDM (ethylene propylene)
- F = FXM (polytetrafluorethylene and propylene)
- K= FFKM (perfluor)
- P = NBR (nitrile)
- T = PTFE (polytetrafluorethylene)
- V = FKM (fluor)

Code for shaft seal. See 1.3 Code for shaft seal.

1.3 Code for shaft seal

The code for shaft seal always consists of four letters.

Example		A	U	U	E
Principal Grundfos type designation for shaft seal	**1**				
Material, rotating seal face	**2**				
Material, stationary seat	**3**				
Material, secondary seal	**4**				

The following codes are used:

Position	Code	Description
1	A	O-ring seal with fixed driver
2 and 3	U	Cemented tungsten carbide
	Q	Silicon carbide
4	E	EPDM
	V	FKM
	K	FFKM

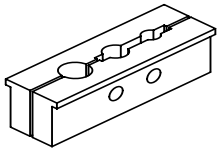
2. Torques and lubricants

Pos.	Designation	Quantity	Dimensions	Torque [Nm]	Lubricant
7.a	Screw	4	M4		
9	Hexagon socket head screw	4	M6	13	THREAD-EZE
			M8	31	
			M10	62	
18	Air vent screw	1	½"	35	
	Air vent screw, spindle	1	M8	3	
23	Plug	1	½"	35	
25	Priming valve	1	½"	35	
	Priming valve, spindle	1	M8	-	
26	Staybolt	4	M12		Gardolube L 6034
28	Hexagon head screw	4	M6	10	THREAD-EZE
			M8	12	
36	Nut for staybolt	4	M12	55	Gardolube L 6034
37	O-ring	2	∅137.5 x 3.3	-	Rocol 22
47a	Bearing	-	-	-	Rocol 22
67	Castle nut	1	M8	12	Gardolube L 6034
100	O-ring	2	-	-	
105	Shaft seal	1	-	-	Soapy water
107	Plug	1	M28	35	

THREAD-EZE, part no. SV9997 (0.5 l).
Gardolube L 6034, part no. SV9995 (1 l).
Rocol 22 (SAPPHIRE AGUA SIL), part no. RM2924 (1 kg).

3. Service tools

A



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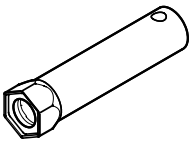

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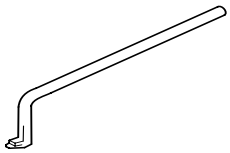

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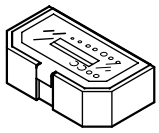

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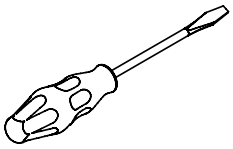

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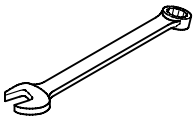

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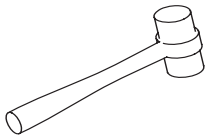
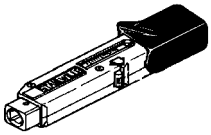
H



I



J

3.1 Special tools

Pos.	Designation	For pos.	Description	Part number
A	Shaft holder for assembly	80		SV0040
B	Tubular box spanner for shaft seal	107		SV2007
C	Puller for neck ring	65		SV0239

3.2 Standard tools

Pos.	Designation	For pos.	Description	Part number
D	Bits kit	9, 26b, 113		SV2010
E	Screwdriver	105	Straight slot	-
		7a	Torx TX20	-
F	Ring/open-end spanner	28, 36	M6 - 10 mm	SV0083
			M8 - 13 mm	SV0055
			M12 - 19 mm	SV0054
G	Socket	28, 36	M6 - 10 mm	SV0806
			M8 - 13 mm	SV0091
			M12 - 19 mm	SV0267
H	Plastic hammer	2	No. 2	SV0349

3.3 Torque tools

Pos.	Designation	For pos.	Description	Part number
I	Torque wrench	9, 26b, 28, 36, 107	1-6 Nm	SV0438
			4-20 Nm	SV0292
			20-100 Nm	SV0269
J	Ratchet insert tool	H	9 x 12, ½" x ½"	SV0295

4. Dismantling and assembly

Position numbers

Position numbers of parts (digits) refer to exploded views, sectional drawings and parts lists; position numbers of tools (letters) refer to 3. Service tools.

Before dismantling

- Disconnect the electricity supply to the motor.
- Close the isolating valves, if fitted, to avoid draining the system.
- Remove the electric cable in accordance with local regulations.
- Note the centre of gravity of the pump to prevent it from overturning. This is especially important in the case of long pumps.

Before assembly

Gaskets and O-rings should always be replaced when the pump is overhauled.

- Clean and check all parts.
- Order the necessary service kits.
- Replace defective parts by new parts.

During assembly

- Lubricate and tighten screws and nuts to the torque stated. See 2. Torques and lubricants.

4.1 Transport bracket

To protect the bearings and the shaft seal, a transport bracket must always be used when transporting the pump without motor.

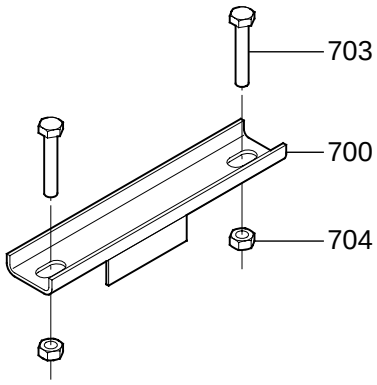


Fig. 1 Transport bracket complete

Flange size	Transport bracket complete pos. 700	Hexagon head screw pos. 703 (2 pcs.)		Nut pos. 704 (2 pcs.)
F85	96465850	ID8022	M6 x 20	96429513
F100	96465850	ID8023	M6 x 25	96429513
F115	96465853	ID8024	M8 x 20	ID0825
F130	96465853	ID8025	M8 x 25	ID0825
F265	96485855	ID7904	M12 x 30	ID7917
56C	96466594	ID1839	UNC 3/8" x 25	96120884
182TC	96472263	ID1840	UNC 1/2" x 25	ID0136

4.1.1 Fitting the transport bracket

1. Remove the motor.
2. Fit the transport bracket.
3. Fit and tighten the two screws (pos. 703) and the nuts (pos. 704).
4. Fit the coupling (pos. 8) and the screws (pos. 9), but leave loose.
5. Place a screwdriver between the coupling and the plug (pos. 107).
6. Lift the shaft/coupling as far as possible and lower the shaft/coupling to half that height.

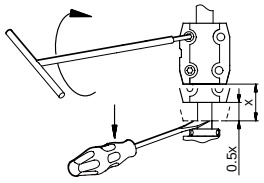


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Fig. 2 Adjustment of chamber stack

7. Hold the shaft/coupling in this position and tighten the four screws in the coupling (pos. 9) diagonally to the torque stated. See 2. Torques and lubricants.
8. The pump can now be transported without motor.

4.1.2 Removing the transport bracket

1. Remove the screws (pos. 9).
2. Remove the loose coupling halves.
3. Remove the screws (pos. 703) and the nuts (pos. 704) and remove the transport bracket.
4. Fit the motor to the pump head.
5. Lubricate and fit the screws (pos. 28) and tighten them diagonally to the torque stated. See 2. Torques and lubricants.
6. Fit the pin (pos. 10) and the two coupling halves (pos. 10a).
7. Lubricate the four screws (pos. 9) with THREAD-EZE and fit them.
8. Check that the gaps either side of the coupling halves are equal.

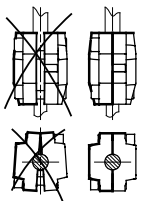

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Fig. 3 Checking the gaps of coupling halves

9. Place a screwdriver between the coupling and the plug (pos. 107).
10. Lift the shaft/coupling as far as possible and lower the shaft/coupling to half that height.

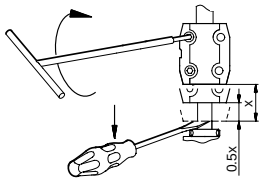

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Fig. 4 Adjustment of chamber stack

11. Hold the shaft/coupling in this position and tighten the four screws in the coupling (pos. 9) diagonally to the torque stated. See 2. Torques and lubricants.
12. Check that the shaft rotates freely and noiselessly.
13. Fit the coupling guards (pos. 7) and the screws (pos. 7a).

4.2 Dismantling the pump

4.2.1 Removing the motor and coupling

1. Remove the screws (pos. 7a) together with the coupling guards (pos. 7).
2. Remove the screws (pos. 9) together with the coupling halves (pos. 10a) and the shaft pin (pos. 10).
3. Remove the screws (pos. 28).
4. Lift the motor off the pump head (pos. 2).
5. Remove the plug (pos. 107) with the O-ring (pos. 106) using the tubular box spanner for shaft seal (pos. B).

4.2.2 Dismantling the shaft seal and the pump main parts

1. Remove the nuts (pos. 36) together with the washers (pos. 66a).
2. Loosen the pump head (pos. 2) including the pump head cover (pos. 77) with a light knock on the edge and lift them free of the staybolts (pos. 26).
3. Remove the corrugated spring (pos. 60).
4. Remove the outer sleeve (pos. 55).
5. Remove the shaft seal (pos. 105).
6. Remove the outlet part (pos. 50a).
7. Lift the chamber stack off the base.
8. Remove the O-rings (pos. 37).

4.2.3 Dismantling the chamber stack

1. Place the shaft holder (pos. A) in a vice, but do not tighten the vice.
2. Fit the shaft pin (pos. 10) into the shaft pin hole and place the chamber stack in the shaft holder (pos. A) and tighten the vice.

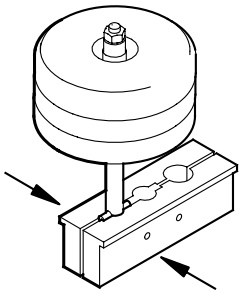

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Fig. 5 Fitting the chamber stack in the holder

3. Remove the bottom part (pos. 5a).
4. Remove the split pin (pos. 67a), the nut (pos. 67) and the splined clamp (pos. 64c).
5. Remove the chamber stack parts: impellers, spacing pipes, chambers and bearing rings. See 5. Order of assembly for chambers and impeller.
6. Remove the driver (pos. 61).
7. If the neck rings (pos. 45) in the chambers are worn, remove them by pressing off the retainer for neck rings using the puller for neck ring (pos. C).

4.3 Mounting

4.3.1 Assembling the chamber stack

1. Fit the neck rings into the chambers (pos. 45) if removed.
2. Place the shaft holder (pos. A) in a vice, but do not tighten the vice.
3. Fit the shaft pin (pos. 10) into the shaft pin hole, place the chamber stack in the shaft holder and tighten the vice.
4. Check that the lock ring of the shaft (pos. 51) is not damaged.
5. Fit the driver (pos. 61).
6. Fit the chamber stack parts on the shaft: chamber, spacing pipe, impeller and bearing ring. See 5. Order of assembly for chambers and impeller.
7. Fit the splined clamp (pos. 66) and the nut (pos. 67) and tighten with 22 Nm.
8. Fit the split pin (pos. 67a).
9. Fit the bottom chamber (pos. 5a).
10. Slacken the vice and remove the chamber stack (pos. 80) and the shaft pin (pos. 10).

4.3.2 Fitting the pump main parts and the shaft seal

1. Fit the O-ring (pos. 37) in the pump head (pos. 2) and in the base (pos. 6) and lubricate them with Rocol 22.
2. Fit the chamber stack on the base.
3. Fit the outer sleeve (pos. 55) in the base and press it home in the base.
4. Fit the outlet part (pos. 50a) and the corrugated spring (pos. 60).
5. If necessary, clean and smooth the shaft end using the holder with emery cloth supplied with the shaft seal kit.
6. Moisten the shaft end with soapy water and fit the shaft seal (pos. 105).
7. Fit the pump head on the pump with the air vent screw (pos. 18) towards the discharge side.
8. Lubricate the threads of the staybolts (pos. 26) with THREAD-EZE.
9. Fit the washers (pos. 66a) and the nuts (pos. 36).
10. Tighten the nuts (pos. 36) diagonally to the torque stated. See 2. Torques and lubricants.

4.3.3 Fitting the motor and coupling

1. Press the O-ring (pos. 106) and the plug (pos. 107) down on the shaft, screw the plug into the pump head and tighten it with 35 Nm using the tubular box spanner for shaft seal (pos. B).
2. Fit the motor to the pump head.
3. Fit the screw (pos. 28), lubricate and tighten them diagonally to the torque stated. See 2. Torques and lubricants.
4. Fit the pin (pos. 10) and the two coupling halves (pos. 10a).
5. Lubricate the four screws (pos. 9) with THREAD-EZE and fit them.
6. Check that the gaps either side of the coupling halves are equal.

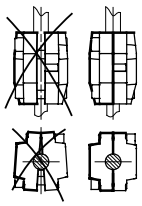

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Fig. 6 Checking the gaps of coupling halves

7. Place a screwdriver between the coupling and the top ring for shaft seal.

8. Lift the shaft/coupling as far as possible and lower the shaft/coupling to half that height.

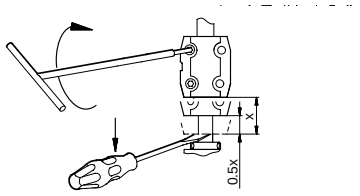

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Fig. 7 Adjustment of chamber stack

9. Hold the shaft/coupling in this position and tighten the four screws in the coupling (pos. 9) diagonally to the torque stated. See 2. Torques and lubricants.
10. Check that the gaps either side of the coupling halves are equal.
11. Check that the shaft rotates freely and noiselessly.
12. Fit the coupling guard (pos. 7) and the screws (pos. 7a).

4.4 Checking and replacing impellers and neck rings

Impeller

1. Check if there is a noticeable groove in the impeller skirts caused by friction (use a finger nail).
2. If there is a groove, the impellers must be replaced.

Neck rings

The neck rings (pos. 45) should always be replaced if the chamber stack has been dismantled.

1. Push the retainer for neck ring (pos. 65) free of the chamber using the puller (pos. C).
2. Remove the neck ring (pos. 45).
3. Fit a new neck ring into the chamber.

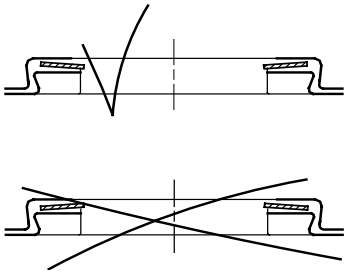

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Fig. 8 Correct fitting of neck ring

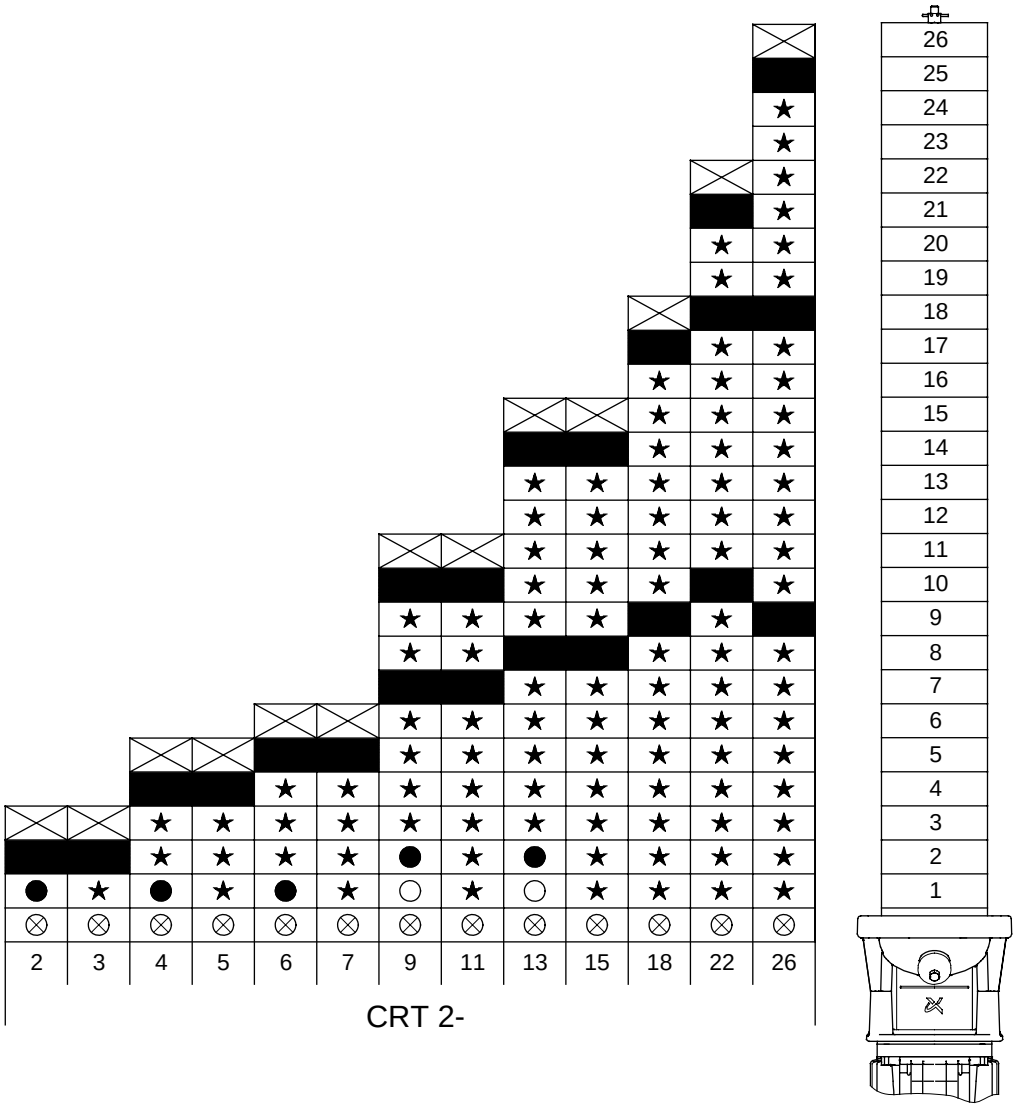
4. Press the retainer for neck ring down on the neck ring and make it engage with the chamber. It must be possible to move the neck ring freely (sideways) between the retainer and the chamber.

Bearing rings

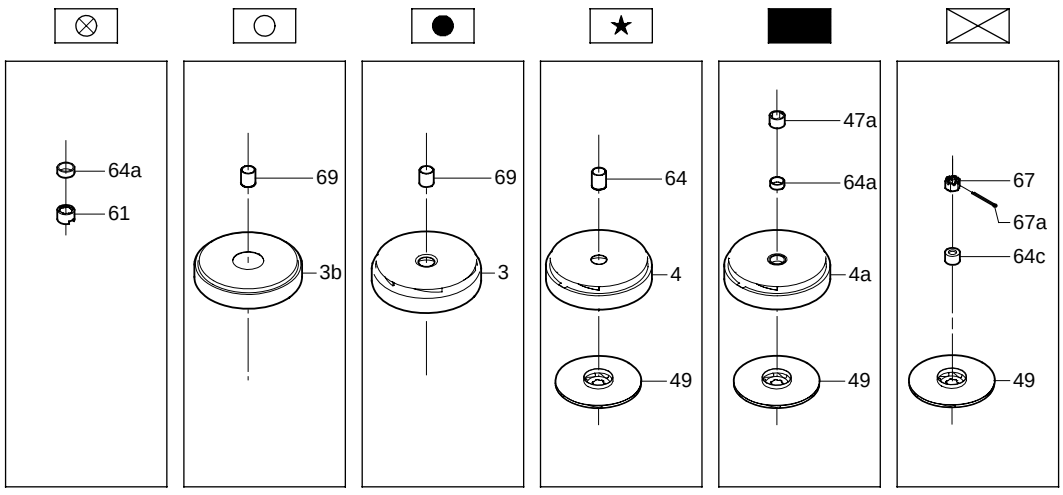
1. Check whether there is a visible or noticeable (use a finger nail) edge on the rotating bearing rings.
2. The bearing rings (pos. 47a) and the chambers with bearing ring (pos. 4a) must be replaced at the same time.

5. Order of assembly for chambers and impeller

CRT 2



CRT 2-



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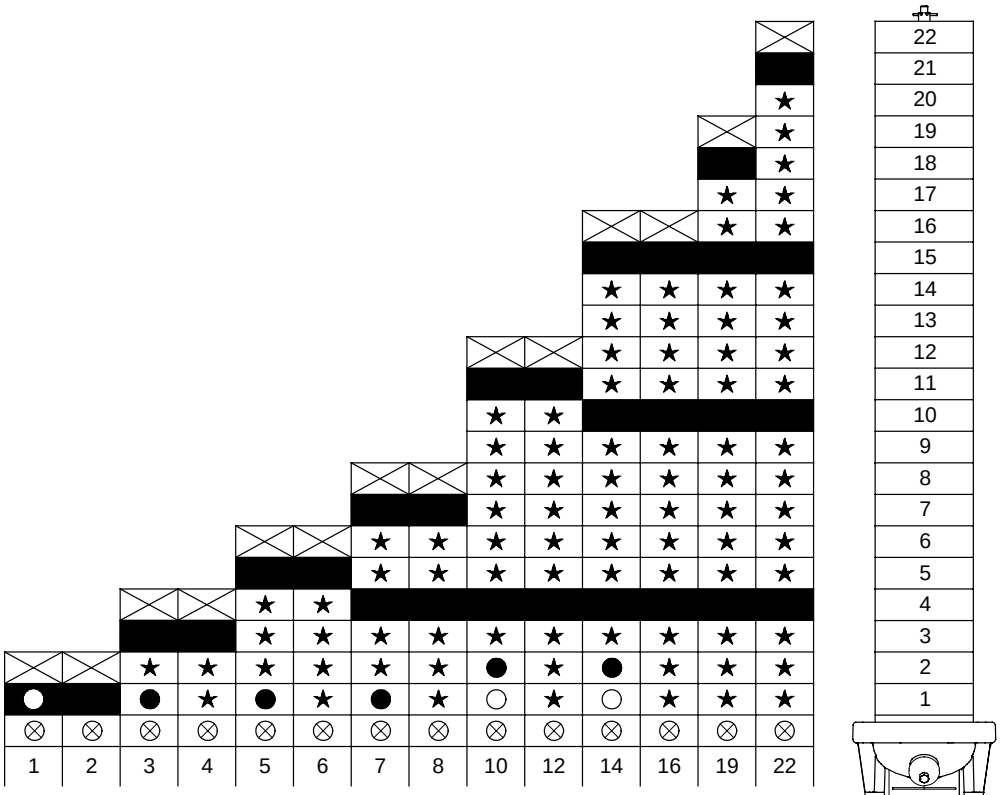
CRT 4



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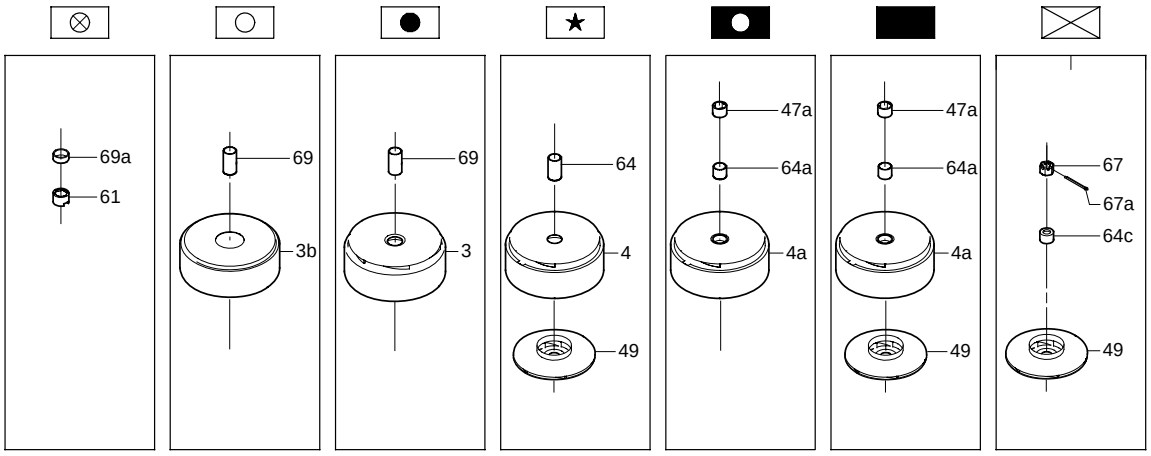

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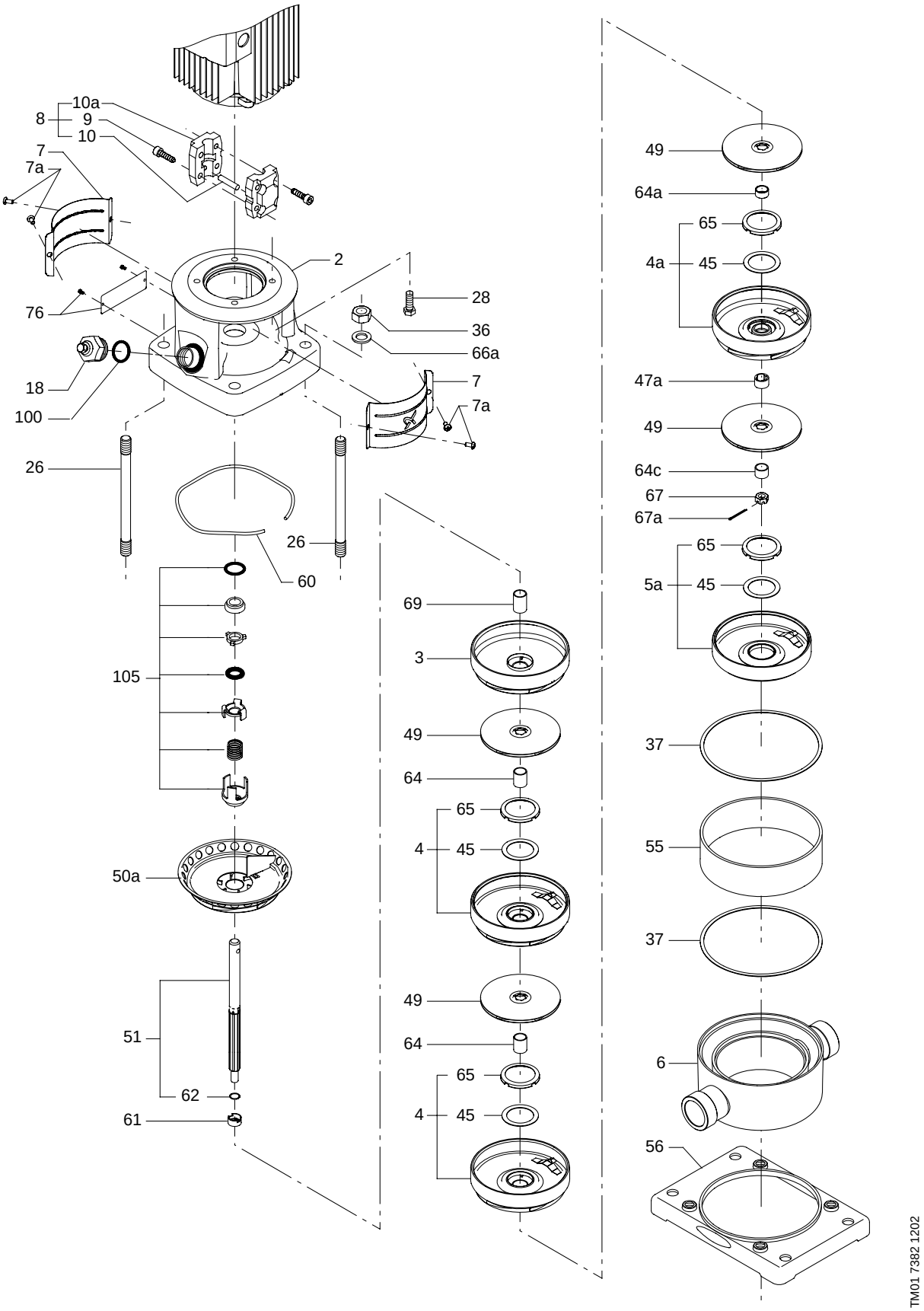
6. Drawings

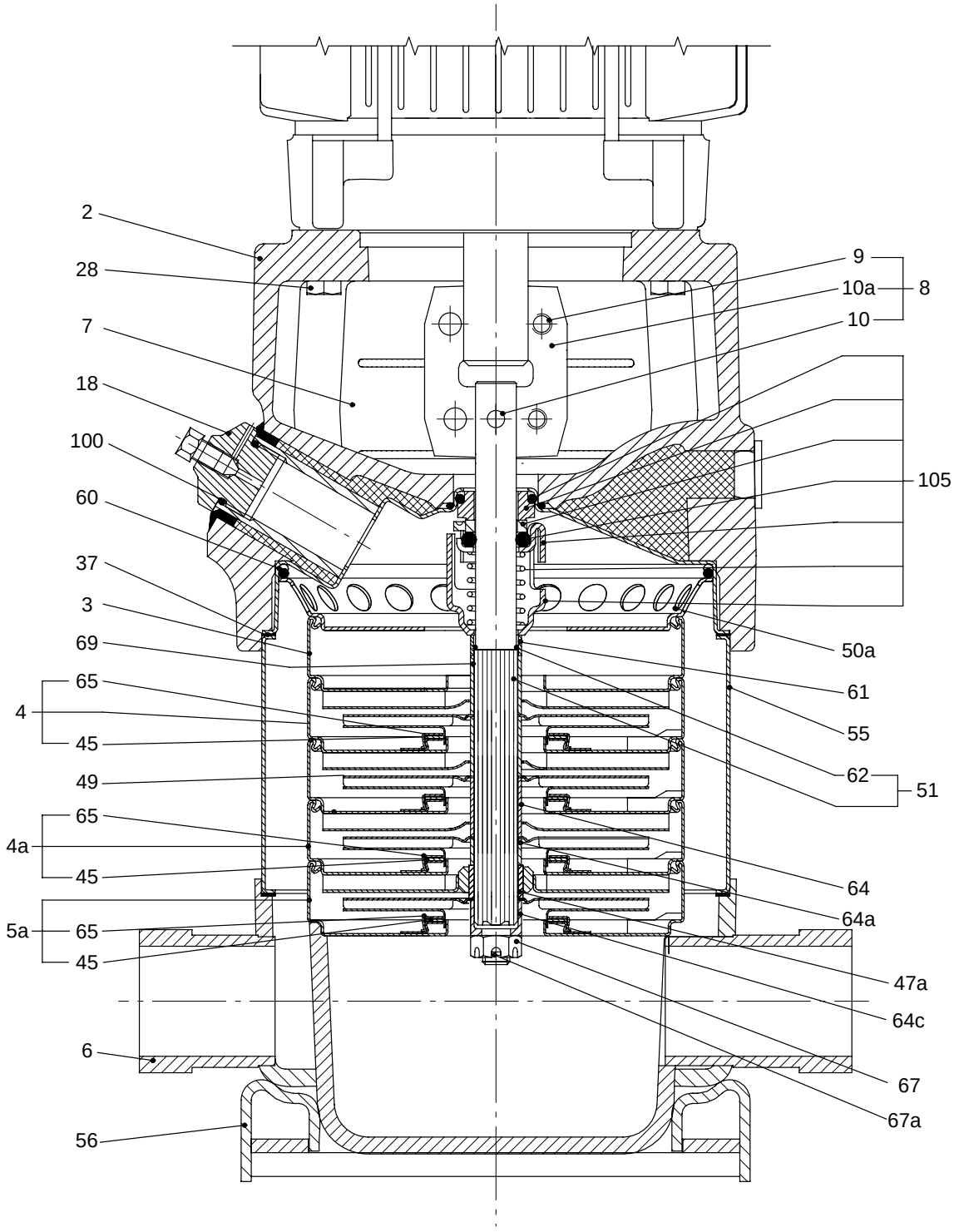
6.1 CRT 2

Exploded view



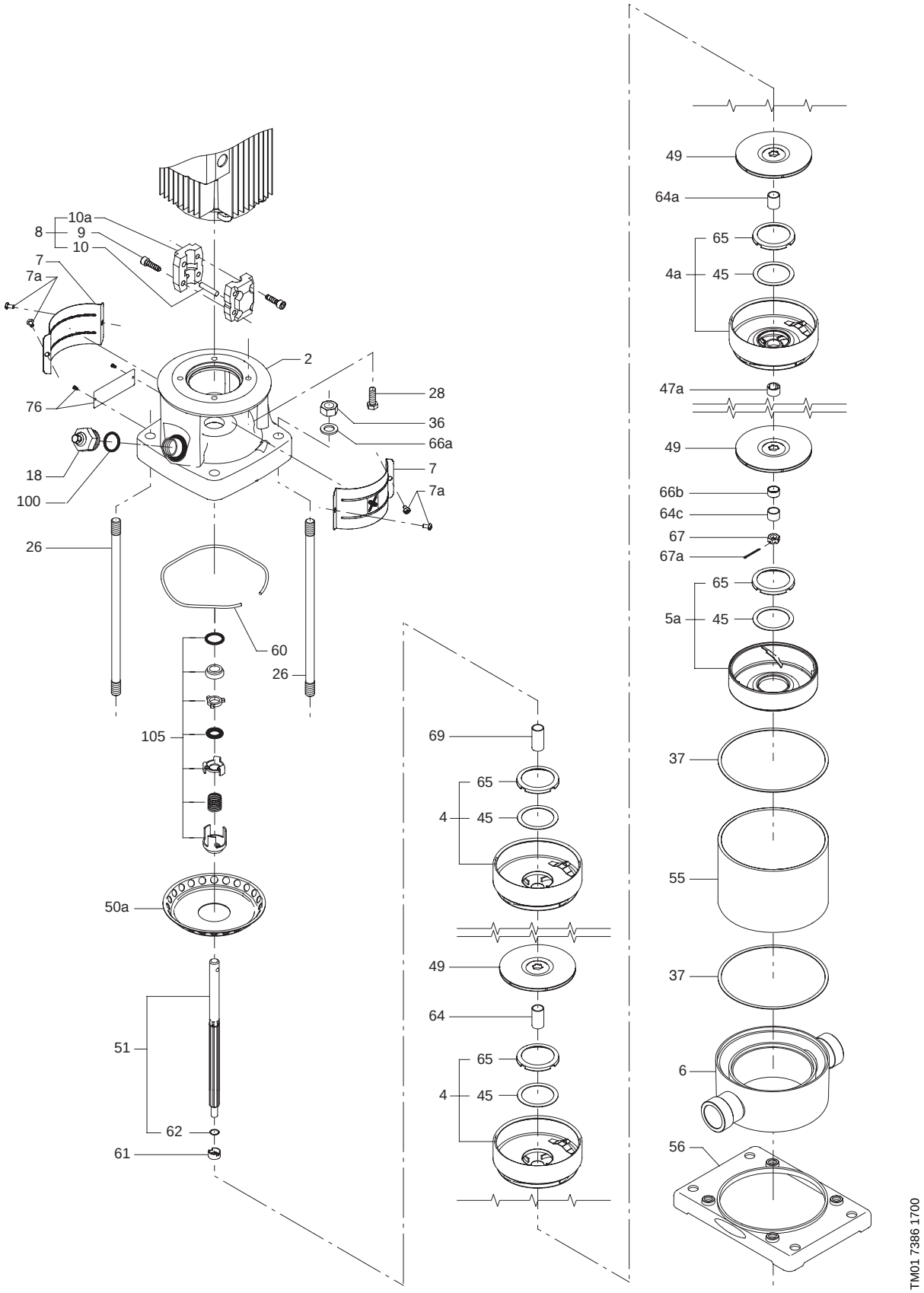
GRUNDFOS

Sectional drawing



6.2 CRT 4

Exploded view



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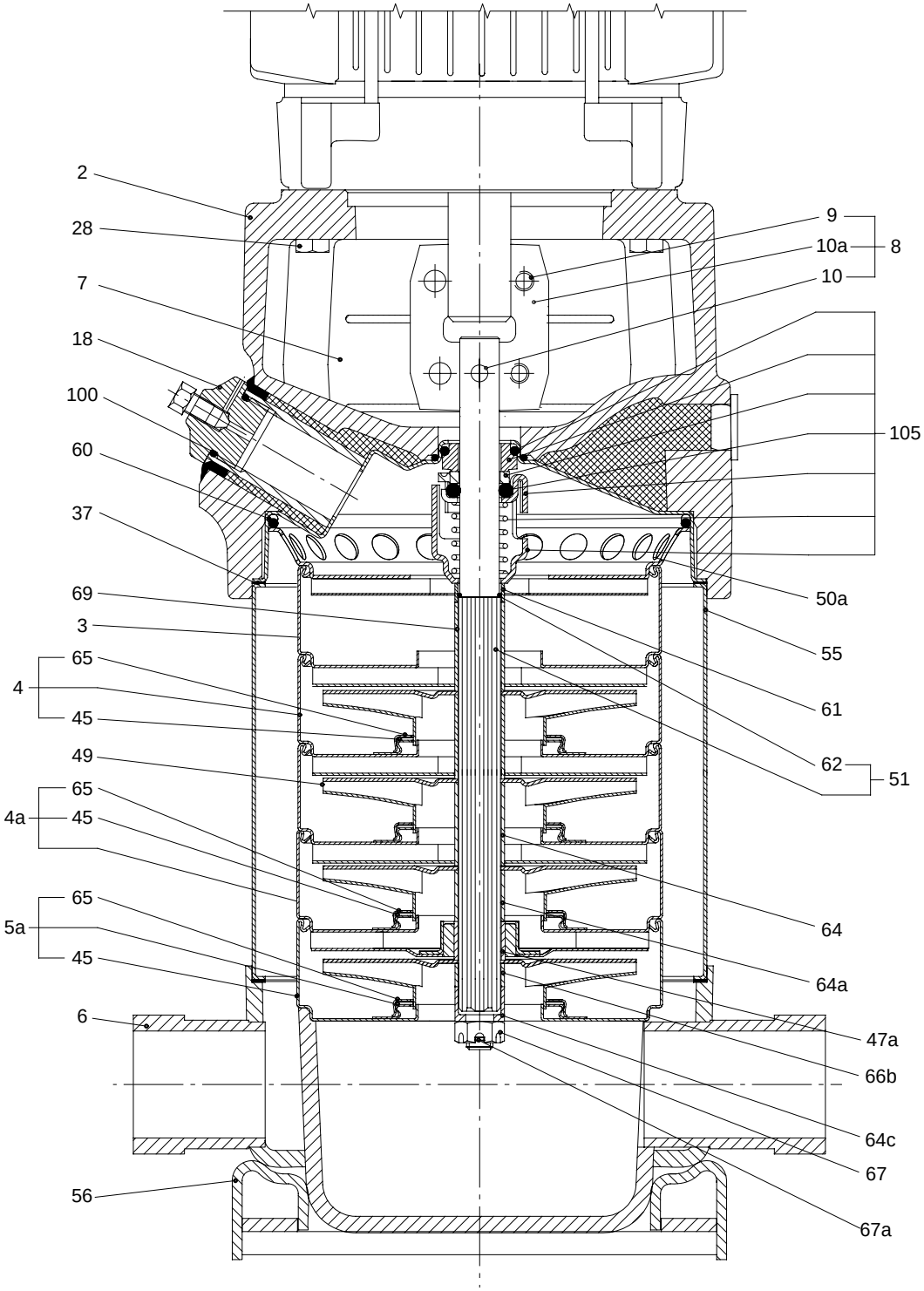
Sectional drawing



Subject to alterations.

GRUNDFOS